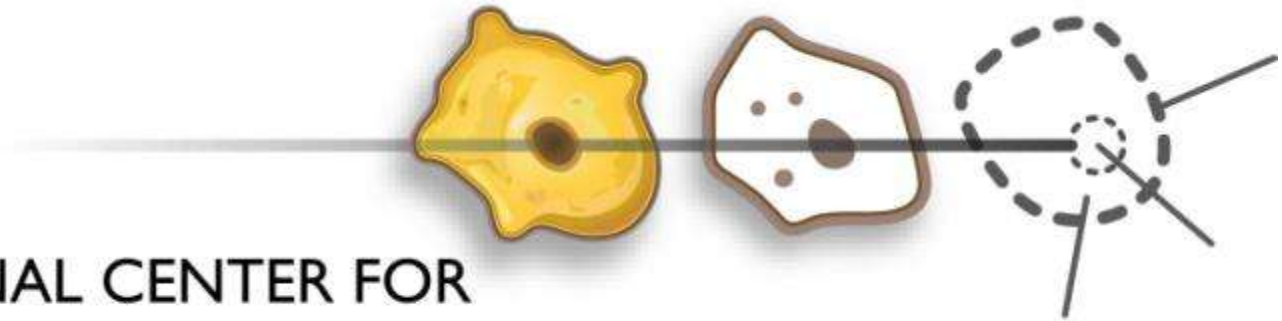
Computer support for evaluation of terminologies and ontologies

Mark Musen

musen@stanford.edu



NATIONAL CENTER FOR

BIOMEDICAL ONTOLOGY

Global Standards in Biomedical Research

Our aim: To discuss how to provide guidance on *which terminologies to use for which purpose* and to provide an overview and status update

The National Center for Biomedical Ontology

- We **create and maintain a library** of biomedical ontologies and terminologies.
- We **buildtools and Web services** to enable the use of ontologies and terminologies.
- We **collaborate with scientific communities** that develop and use ontologies and terminologies in biomedicine.

Access all ontologies that are available in BioPortal: You can filter this list by category to display ontologies relevant for a certain domain (try selecting "Anatomy or Experimental Conditions" in the "Filter by category" menu below). You can also filter ontologies that belong to a certain group such as ontologies from the OBO Foundry, or ontologies from the Cancer Biomedical Informatics Grid (caBIG). Subscribe to the BioPortal RSS feed to receive alerts for submissions of new ontologies, new versions of ontologies, new notes, and new projects. You can subscribe to feeds for a specific ontology at the individual ontology page. Add a new biomedical ontology to BioPortal using the Submit New Ontology link (you need to sign in to see this link).

SUBMIT ONTOLOGY	Submit New Ontology
FILTER BY CATEGORY	All Categories
FILTER BY GROUP	All Groups — Link To This Filter
FILTER BY TEXT	

Subscribe to all updates

ONTOLOGY NAME	FORMAT	VERSION	AUTHOR	UPLOADED ON	GROUP	STATUS
ABA Adult Mouse Brain (ABA)	OWL	1.0	Allen Institute for Brain Science	08/08/2009		Explore
African Traditional Medicine (ATMO)	OBO Format	1.101	Ghislain Atemezing	06/28/2009		Explore
Amino Acid (amino-acid)	OWL	1.2	Nick Drummond, Georgina Moulton, Robert Stevens, Phil Lord	04/25/2009		Explore
Amphibian gross anatomy (AAO)	OBO Format	1.8	AmphiAnat list	07/30/2008	OBO Foundry	Explore
Amphibian taxonomy (ATO)	OBO Format	See Remote Site	AmphiAnat list	08/14/2009		
Animal natural history and life history (ADW)	PROTEGE	See Remote Site	Http://animaldiversity Administrators	04/27/2009		
Ascomycete phenotype ontology (APO)	OBO Format	1.6	Fungal_anatomy Administrators	09/01/2009		Explore
Basic Formal Ontology (BFO)	OWL	1.1		07/24/2009		Explore
Basic Vertebrate Anatomy (basic-vertebrate-gross-anatomy)	OWL	1.1		01/16/2007		Explore
Bilateria anatomy (BILA)	OBO Format	See Remote Site	Thorsten Heinrich	04/13/2009		
Biological imaging methods (FBbi)	OBO Format	1.1	Image Administrators	07/30/2008		Explore

BioPortal allows us to experiment with new models for

- Dissemination of terminologies, ontologies, and knowledge on the Web
- Integration and alignment of online content
- Knowledge visualization and cognitive support
- Peer review of online content

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Biological imaging methods (FBbi)	OBO Format	1.1	Image Administrators	07/30/2008		Explore

NCI Thesaurus **Version 09.07**

Invasive Skin Melanoma | Link Here | Subscribe

View Ontology Details

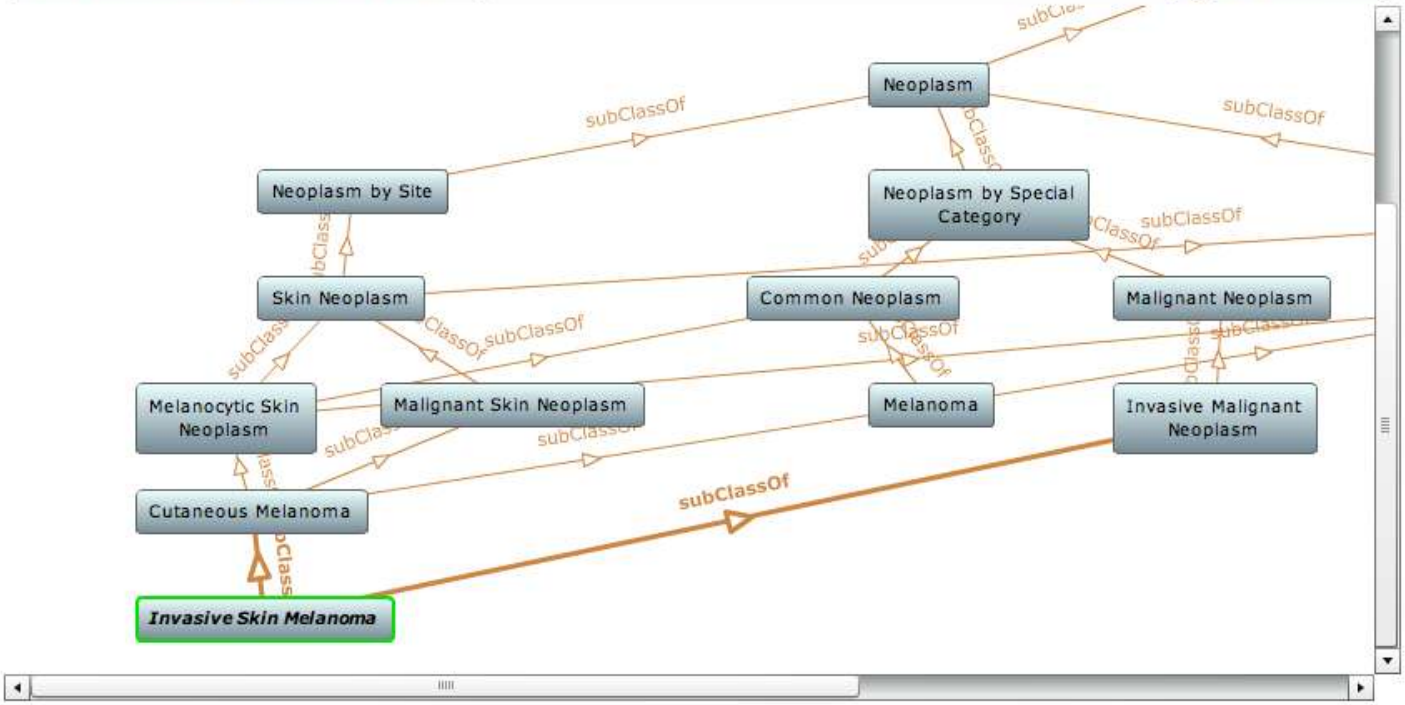
Jump To: Go

Legend

- Endocrine Neoplasm
- Eye Neoplasm
- Gastrointestinal Neoplasm
- Head and Neck Neoplasm
- Hematopoietic and Lymphoid System Neoplas
- Nervous System Neoplasm
- Peritoneal and Retroperitoneal Neoplasms
- Reproductive System Neoplasm
- Respiratory Tract Neoplasm
- Skin Neoplasm
  - Benign Skin Neoplasm
  - Cutaneous Hematopoietic and Lymphoid
  - Dermal Neoplasm
  - Epithelial Skin Neoplasm
  - Malignant Skin Neoplasm
    - Blastic Plasmacytoid Dendritic Cell N
    - Cutaneous Lymphoma
    - Cutaneous Melanoma
      - Acral Lentiginous Melanoma
      - Amelanotic Skin Melanoma
      - Balloon Cell Melanoma
      - Desmoplastic Melanoma
      - Hereditary Melanoma
      - Invasive Skin Melanoma
      - Lentigo Maligna Melanoma
      - Malignant Melanoma in Precance
      - Melanoma Arising from Blue Nevi
      - Melanoma in Congenital Melanoc
      - Melanoma in Junctional Nevus
      - Minimal Deviation Melanoma
      - Nevoid Melanoma
      - Nodular Melanoma
      - Old Burn Scar-Related Skin Mela
      - Recurrent Melanoma of the Skin
      - Regressing Skin Melanoma

Details | Visualization | Notes (0) | Mappings (0) | Resources alpha

Show Hierarchy To Root (All Relationships) | Full Version



The National Center for Biomedical Ontology is one of the National Centers for Biomedical Computing supported by the NIH Roadmap.
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How to know which terminology to use?

- Browse available terminology content on the Web in BioPortal
- Examine programmatically determined quality metrics
- Read reviews linked to online content
- See where other users are making comments
- Compute which ontology best matches available data

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Ontology Metrics

- Statistics:
  - Number of classes
  - Number of instances
  - Number of properties
  - Maximum depth of the class hierarchy
  - Maximum number of siblings
  - Average number of siblings
- Metrics assessing conformance to best practices:
  - Classes with a single subclass
  - Classes with a large number of subclasses (more than 20)
  - Classes with no definition
- Auditing information:
  - Contributors and authors of individual classes

The Metrics Page in BioPortal

NCI Thesaurus

Subscribe to updates

Metadata | Views (1) | Projects (2) | Reviews (0) | **Metrics** | Ontology Widgets

BioPortal calculates the metrics on the salient properties of the ontology, including statistics and quality-control and quality-assurance metrics. Each ontology may have all, some, or no values filled in for its metrics and only metrics for the most recent version are reflected. See metrics descriptions

Metrics are not available for the most recent version of this ontology. The metrics displayed below are for the NCI Thesaurus 09.07 version.

NUMBER OF CLASSES:	74646
NUMBER OF INDIVIDUALS:	0
NUMBER OF PROPERTIES:	191
MAXIMUM DEPTH OF THE CLASS HIERARCHY:	14
MAXIMUM NUMBER OF SIBLINGS IN THE CLASS HIERARCHY:	3215
AVERAGE NUMBER OF SIBLINGS IN THE CLASS HIERARCHY:	139
CLASSES WITH A SINGLE SUBCLASS:	5153 / 74646 (6.90%) of classes have only one subclass
CLASSES WITH LARGE NUMBER OF SUBCLASSES:	22932 / 74646 (30.72%) of classes have more than 25 subclasses
CLASSES WITH NO AUTHOR:	No author property specified or no values for the author property
CLASSES WITH NO DEFINITION:	37788 / 74646 (50.62%) of classes have no definition property specified or no values for the definition property

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International Classification of Diseases

Subscribe to updates

Metadata | Views (0) | Projects (2) | **Reviews (1)** | Notes (0) | Metrics | Ontology Widgets

Review This Ontology

REVIEW BY VCDE

Review of ICD-10 The caBIG vocabulary review was based upon a concise set of approximately 105 evaluation criteria divided into four sections: Structure - the nature of how knowledge is represented; Content - how well the content covers the knowledge domain including levels of granularity for specific use case; Editorial - the strength of vocabulary governance, curation and community outreach; and lastly Documentation - is there sufficient published information on what, how, when and why a vocabulary exists to fulfill its mission. Acceptance of this terminology by the VCDE is pending. See: https://wiki.nci.nih.gov/display/VCDE/ICD-10 Review Final Report#ICD-10ReviewFinalReport-TheReviewProcess for more details.

Common Terminology Criteria for Adverse Events

Subscribe to updates

Metadata	Views (0)	Projects (0)	Reviews (1)	Notes (0)	Metrics	Ontology Widgets

Review This Ontology

REVIEW BY VCDE

Review for Version 3 The review was performed using VRC version 2.0. The VRC criteria include elements for: -Understandability, Reproducibility and Usability -Quality of Documentation -Maintenance and Extensions -Accessibility and Distribution -Intellectual Property Considerations -Quality Assurance and Quality Control -Textual Definitions -Community Acceptance -Reporting Requirements The review concluded that the CTCAE as represented in the NCIT does a reasonable job of meeting the caBIG-VCDE requirements for controlled terminologies. This is due to a favorable combination of CTEP's documentation and content coverage with the NCIT's good terminology practices. Most areas needing improvement can be remedied with relatively little effort (compared to the effort needed to add the CTCAE to the NCIT in the first place). However, developing on-going maintenance policies and procedures for the CTCAE and its reconciliation with MedDRA will be require significant commitment by both CTEP and the NCIT. CTCAE version 3 is not recommended as a %u201Ccertified%u201D NCI standard vocabulary. See: https://gforge.nci.nih.gov/frs/?group_id=236 for more details.

Gene Ontology

Subscribe to updates

Metadata | Views (8) | Projects (5) | **Reviews (1)** | Notes (0) | Metrics | Ontology Widgets

Review This Ontology

REVIEW BY VCDE

- ★★★★★ Usability
- ★★★★★ Domain Coverage
- ★★★★★ Correctness
- ★★★★★ Quality Of Content
- ★★★★★ Degree Of Formality
- ★★★★★ Documentation And Support

The Gene Ontology (GO) was reviewed against a set of 102 proposed vocabulary review criteria (VRC 1.0). The criteria include elements for: -Understandability, Reproducibility and Usability -Quality of Documentation -Maintenance and Extensions -Accessibility and Distribution -Intellectual Property Considerations -Quality Assurance and Quality Control -Textual Definitions -Community Acceptance -Reporting Requirements GO fulfilled 80 of the 102 proposed vocabulary review criteria elements; 5 criteria were determined to be partially met; and 4 criteria were not met by the GO. In addition, 12 criteria were considered to be not applicable with regards to the GO. Only one of the criteria was not assessed. See: https://gforge.nci.nih.gov/frs/?group_id=183 for more details.

SNOMED Clinical Terms

Subscribe to updates

Metadata | Views (6) | Projects (1) | **Reviews (1)** | Notes (0) | Metrics | Ontology Widgets

Review This Ontology

REVIEW BY VCDE

- Usability
- Domain Coverage
- Correctness
- Quality Of Content
- Degree Of Formality
- Documentation And Support

The review group found that SNOMED CT has fully, or in-part, satisfied all of the review criteria except one. The group recommended that SNOMED CT be %u201Ccertified%u201D as an NCI standard vocabulary. The group further recommended that usage and implementation be further defined formerly via a consensus approach to VCDE, and provide recommendations for further enhancing the vocabulary evaluation instrument, especially as a number of ontologies are on the vocabulary standardization roadmap. See https://cabig.nci.nih.gov/workspaces/VCDE/Meetings/VCDE_Workspace_Meetings /Oct2_VCDE_Meeting for more details on the SNOMED CT Review.

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Latest Notes

New Term Proposal: Exercise Study Facility (Biomedical Resource Ontology) about 5 hours ago by Mette

---

New Term Proposal: Sleep Study Facility (Biomedical Resource Ontology) about 11 hours ago by Mette

---

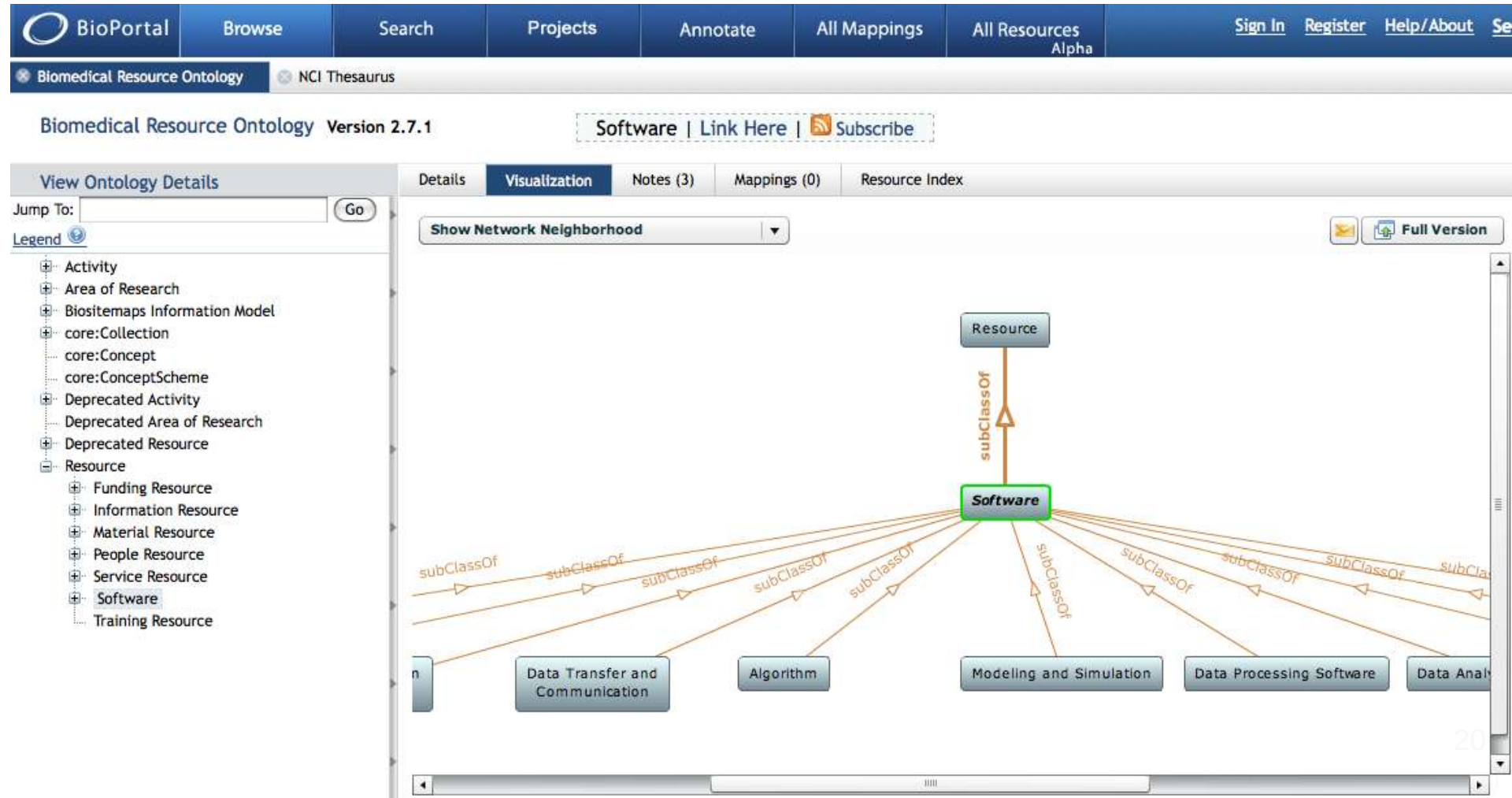
Duplicate term (Vaccine Ontology) 2 days ago by whetzel
This term appears twice in VO. Once with a VO identifier and also with OBI_1110034. See http://...

Deprecate (Biomedical Resource Ontology) 21 days ago by whetzel
Deprecate this term, but leave child term for only child of Modeling and Simulation.

---

re-activate this term (Biomedical Resource Ontology) 21 days ago by whetzel
Re-activate this term.

Biomedical Resource Ontology in BioPortal



View Ontology Summary

Jump To: Go

Legend

- Activity
- Area of Research
- Biositemaps Information Model
- core:Collection
- core:Concept
- core:ConceptScheme
- Deprecated Activity
- Deprecated Area of Research
- Deprecated Resource
- Resource
  - Funding Resource
  - Information Resource
  - Material Resource
    - Assessment Material Resource
    - Biomaterial Supply Resource
    - Biomedical Supply Resource
    - Facility Core
      - Biosafety Level Facility
      - Cell Biology Facility
      - Fabrication Facility
      - Imaging Facility
      - Molecular Biology Facility
      - Physiology Facility
        - Cardiovascular Facility
        - Metabolism Facility
        - Neurological Facility
        - Nutrition Facility
      - Research Animals Facility
      - Tissue Organ Facility
    - Instrument
    - Laboratory Supply Resource
    - Medical Device
    - Reagent Resource
  - People Resource
  - Service Resource
  - Software
  - Training Resource

Details | Visualization | Notes (2) | Mappings (0) | Resource Index

Show 50 entries Search:

SUBJECT	AUTHOR	TYPE	CREATED
New Term Proposal: Exercise Study Facility	Mette	New Term Proposal	06/15/2010

New Term Proposal: Exercise Study Facility

New Term Proposal submitted by **Mette** about 5 hours ago on Physiology Facility in Biomedical Resource Ontology

PREFERRED NAME: Exercise Study Facility
PROPOSED ID:
PARENT: http://bioontology.org/ontologies/BiomedicalResourceOntology.owl#Physiology_Facility
REASON FOR CHANGE: Physiology facility child
CONTACT INFO:
SYNONYMS:
DEFINITION: A facility or core devoted to exercise studies

Please login to submit notes

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REASON FOR CHANGE	Physiology facility child	CONTACT INFO		
SYNONYMS				
DEFINITION	A facility or core devoted to exercise studies			

Responses

hide all | show all

RE: New Term Proposal: Exercise Study Facility by whetzel 5 days ago

Can you expand on what an exercise study is?

reply

Exercise study facility definition by Mette 4 days ago

A facility or core that provides services and equipment related to exercise physiology

reply

Please login to submit notes

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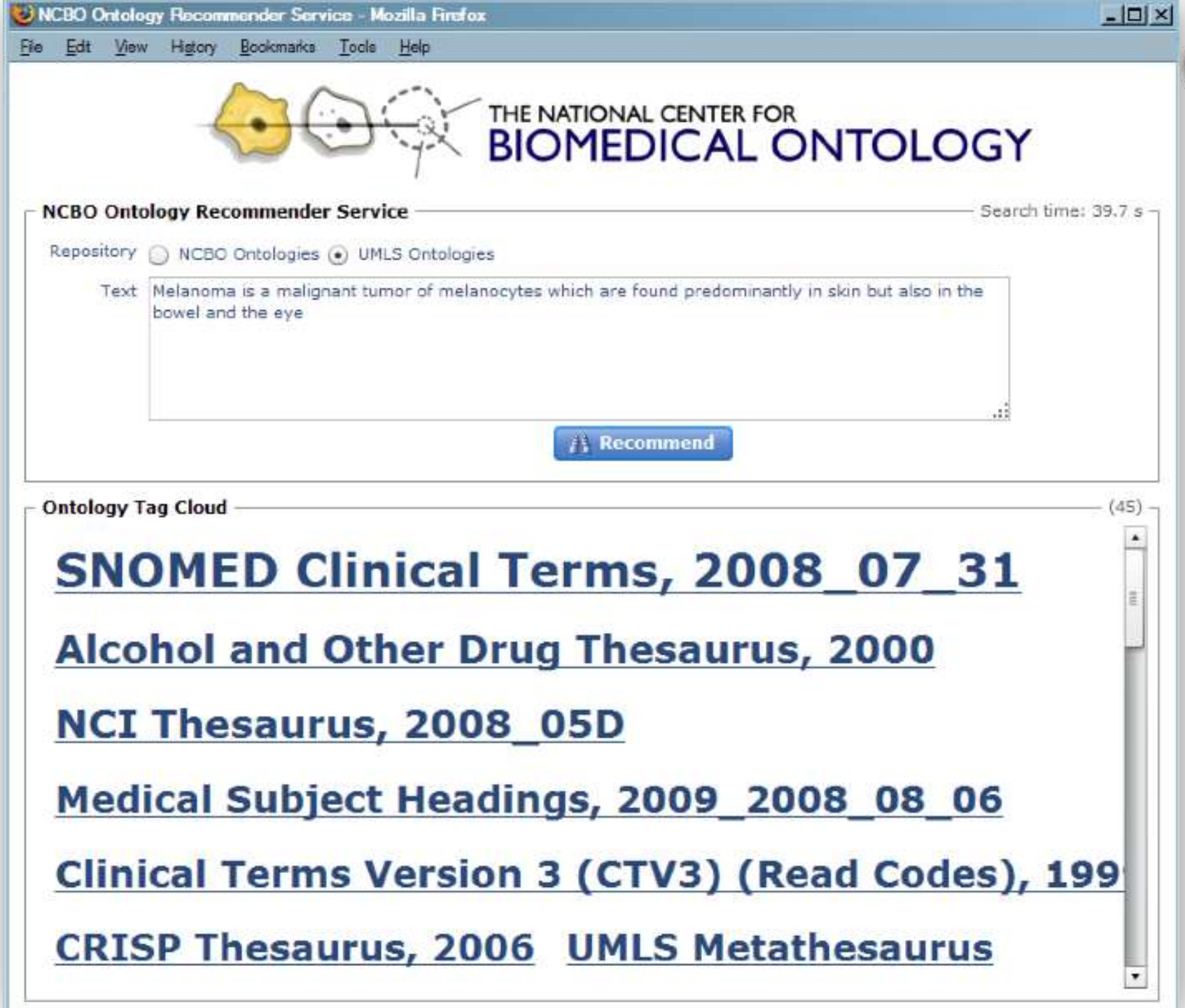
NCBO Ontology Recommender Service - Mozilla Firefox
File Edit View History Bookmarks Tools Help
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NCBO Ontology Recommender Service
Search time: 39.7 s
Repository
NCBO Ontologies
UMLS Ontologies
Text
Melanoma is a malignant tumor of melanocytes which are found predominantly in skin but also in the bowel and the eye
Recommend
Ontology Tag Cloud
(45)
SNOMED Clinical Terms, 2008_07_31
Alcohol and Other Drug Thesaurus, 2000
NCI Thesaurus, 2008_05D
Medical Subject Headings, 2009_2008_08_06
Clinical Terms Version 3 (CTV3) (Read Codes), 199
CRISP Thesaurus, 2006
UMLS Metathesaurus

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The Open Biological and Biomedical Ontologies

Ontologies | Resources | Participate | About

The OBO Foundry is a collaborative experiment involving developers of science-based ontologies who are establishing a set of principles for ontology development with the goal of creating a suite of orthogonal interoperable reference ontologies in the biomedical domain. The groups developing ontologies who have expressed an interest in this goal are listed below, followed by other relevant efforts in this domain.

In addition to a listing of OBO ontologies, this site also provides a statement of the OBO Foundry principles, discussion fora, technical infrastructure, and other services to facilitate ontology development. We welcome feedback and encourage participation.

Click any column header to sort the table by that column. The s link to the term request trackers for the listed ontologies.

OBO Foundry ontologies

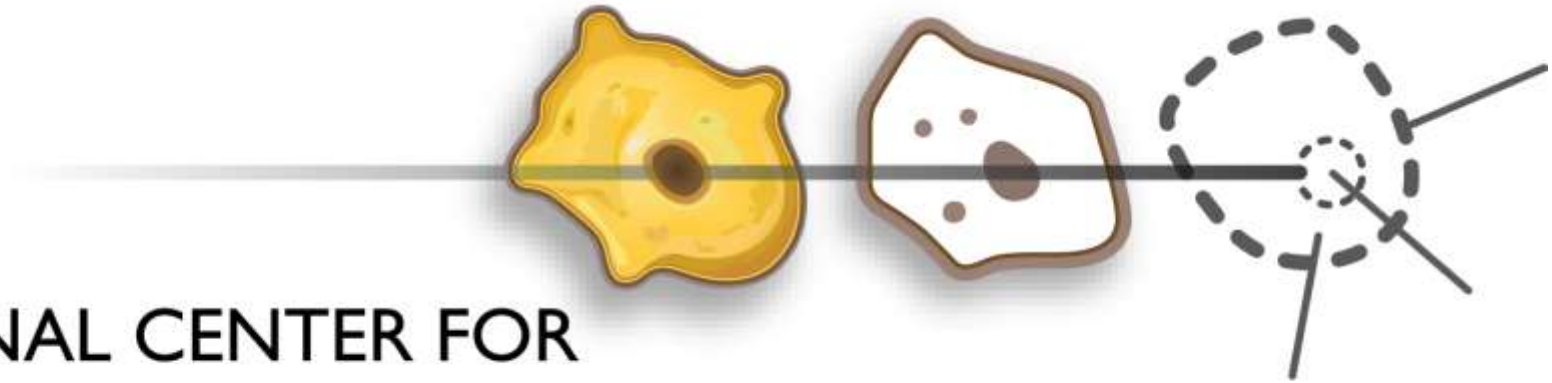
Title	Domain	Prefix	File	Last changed
Biological process	biological process	GO	gene_ontology_edit.obo	2010/06/20
Cellular component	anatomy	GO	gene_ontology_edit.obo	2010/06/20
Chemical entities of biological interest	biochemistry	CHEBI	chebi.obo	2010/06/03
Molecular function	biological function	GO	gene_ontology_edit.obo	2010/06/20
Phenotypic quality	phenotype	PATO	quality.obo	2010/05/15
PRotein Ontology (PRO)	proteins	PRO	pro.obo	2010/06/12
Xenopus anatomy and development	anatomy	XAO	xenopus_anatomy.obo	2009/12/02
Zebrafish anatomy and development	anatomy	ZFA	zebrafish_anatomy.obo	2010/06/14

OBO Foundry candidate ontologies and other ontologies of interest

Title	Domain	Prefix	File	Last changed
Amphibian gross anatomy	anatomy	AAO	amphibian_anatomy.obo	2008/06/19
Amphibian taxonomy	anatomy	ATO	amphibian_taxonomy.obo	
Ascomycete phenotype ontology	phenotype	APO	ascomycete_phenotype.obo	2010/05/12
Basic Formal Ontology	upper	BFO	1.1	
Bilateria anatomy	anatomy	BILA	bilateria_mrca.obo	
Biological imaging methods	experiments	FBbi	image.obo	2010/05/05
BRENDA tissue / enzyme source	anatomy	BTO	BrendaTissueOBO	
C. elegans development	anatomy	WBls	worm_development.obo	2008/01/31
C. elegans gross anatomy	anatomy	WBbt	WBbt.obo	2010/06/11
C. elegans phenotype	phenotype	WBPhenotype	worm_phenotype.obo	2010/06/19

BioPortal's methods for ontology selection

- Are highly scalable
- Are not biased by particular philosophies of ontological modeling
- Allow users to consider context of use
- Assume an active, engaged user community
- Provide a great opportunity to evaluate the utility of open rating systems and "crowd sourced" peer review



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